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GLACE
A Narrative of Hydraulic Cement Mined
in the Lehigh Valley

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A Narrative of Hydraulic Cement
Mined in the Lehigh Valley

WITH A DESCRIPTION OF IT'S USE
IN THE EARLY DAYS

BY WILLIAM H. GLACE

1912





FIRST CEMENT MINED IN THE LEHIGH VALLEY AT LEHIGH GAP

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PREFACE.

Some time ago in conversation with Hon. Frank M. Trexler, I casually stated that my father, Samuel Glace, erected the first mill and manufactured Natural Cement in the Lehigh Valley in 1826, when he stated that all books on the subject stated it was at Coplay in 1864, and that if I would write a sketch of the matter it would be an interesting contribution to local history.

In accordance with this suggestion I have prepared this sketch :

WILLIAM H. GLACE.

Catasauqua, Pa., February 12, 1912.

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A NARRATIVE OF HYDRAULIC CEMENT

Mined in the Lehigh Valley

Natural cement has been in use in the United States near a hundred years, it being used in the construction of the Erie Canal in 1819.

In the construction and maintenance of the Lehigh Canal in the early days it was manufactured in two places—at Lehigh Gap in 1826-1830, and at Siegfried's, Pa., from 1830 to 1841 by the late Samuel Glace.

The hydraulic cement, as it was then called at the Gap Mill, was considered by the Lehigh Coal and Navigation engineers of greater strength than that made at Siegfried's and all the locks and other structures North of the Gap were built from cement made at this mill.

The engineers in locating the proposed Canal found cement rock which had been washed down from Sandy Ridge by the erosion of ages and, tracing the same, found the "pocket" in the top overlooking the present Palmer-ton Zinc Works.

Abiel Abbott, of Forty Fort, Pa., one of the first superintendents of the Lehigh Co., upon assuming his duties brought with him a number of hardy young men from the Wyoming Valley and southern portion of Luzerne Co., whose knowledge of river life and fair English school education would fit them to hold positions in the construction and maintenance of the canal.

Amongst them were Chauncey D. Fuller, Samuel Glace, Joseph Wheeler, George Knickerbocker, George Cooper, Joseph Chapman, Nathan Van Horn, John Brown, Austin Peckins and others. Few returned and the descendants of the others remain with us.

To Samuel Glace was assigned the proposed erection of the cement mill at Lehigh Gap, which was done under direction of the Company's engineers.

In October, 1906, in company of Tyndale Craig and a photographer we visited the place and had views taken.

From the late Col. Thos. B. Craig and Nathan Van Horn I obtained a fair description of the plant.

It was situated between the present canal and river opposite Craig's hotel. The kilns were built against the west bank of the proposed canal, and from the ruins it appears were four in number, and were erected from fire stones, a granite so hard that fire had little effect, and in appearance resembled a lime kiln, but conical in shape, 10 to 15 feet in height, sloping toward the top with eyes or numerous openings at the bottom to create a draft to burn the cement with the wood, which was placed in layers in an upright position, thus to burn rapidly and prevent caking of the cement. A dam had been placed at the river bank to divert the water into a race, at the end of which was an overshot wheel to create the motive power for the burrs or mill stones to crush the stones, the kilns were kept burning day and night, and after being emptied, allowed to cool and then again refilled.

As soon as a kiln was properly burned, it was drawn up an inclined plane, thrown into a hopper, same as a grist mill, and being ground fine was at bottom placed in wooden boxes or trays with handles at both ends, so two men facing in the same direction could carry them ready to be used and transported to places where locks and kindred constructions were being erected, and culverts to carry running water from springs and natural water courses under the bed of canal.

Through the courtesy of Tyndale Craig, I was shown the ruins of the first plant for grinding and preparing the "Hydraulic Cement," as it was then called. The

foundations and cribbing where the river had been dammed to run the overshot wheel, and the holes where the kilns stood were all plainly visible. Mr. Van Horn, a few years prior to his death, informed me that the cement made here was superior to that of the Siegfried plant, and in the demolishing and abandonment of the weigh-locks below Mauch Chunk upon the completion of the Lehigh and Susquehanna R. R. it required extensive blasting and the highest then known explosive to break up solid walls of which the lock was composed, this being sixty years after its erection. After the mills were operated five or six years, it was found the "pocket of cement" was likely to become exhausted and a search was made for a further supply, but none was found sufficient.

Out-cropping of cement was found on this ridge six miles east of the Lehigh Gap, where the Aquashicola Creek flows through a gap. This Sandy mountain is a spur of the Blue Mountain, running parallel to it to the Delaware River, one mile north of the Northern side, and at places rises to quite an altitude.

These investigations, which showed no further pockets of cement, were in later years found to be correct.

The ridge has been the despair of promoters. Plumbago, cement, limestone, slate and many other kinds of minerals have been found. The mountain has been tunneled six miles from the river eastward, much money sunk, but no paying proposition evidenced, save the operation of the "Prince Paint Co.," and in later years, when vast bodies of sand have been worked and a limited quantity found its way to the market, but the freight was an obstacle to its general use.

The cement was taken from the "pocket" and afterward loaded in wagons, and owing to the steep mountains it was taken by way of Towamensing church, on



RUINS OF THE FIRST CEMENT MILL IN THE LEHIGH VALLEY

the road passing Snyders, now Palmerton, to the Gap, a distance of near six miles, which was expensive.

Fortunately, in digging the canal at Siegfrieds, cement rock was found, though much harder. Preparations were made to abandon the plant, and my father, Samuel Glace, then made his headquarters at the old stone hotel, still standing on the ridge above the entrance to the bridge at Siegfrieds. The tail-race of the lock which drains the surplus water from the canal above the lock was used to provide the motive power to run the over-shot wheel to grind the stone. These kilns were built much larger than the former ones.

Capt. Theodore H. Howell, residing at Siegfrieds, informed me that when he came there in 1837 there were four kilns erected and in operation. They were known as draw kilns, fire being placed in the eye at the bottom of the kilns, drawn at the bottom and hoisted up an incline plane or tramway and emptied into a hopper, where the stone were crushed by machinery shaped like a corn crusher, then dropped down and ground by burr mill-stones, then placed in boxes or trays with handles, then transported in scows to points on canal where needed. These scows were drawn by mules with a steersman on a platform on the rear of the scow, having a large tiller, 15 feet long, ending in a large blade or paddle, which tiller was fastened on a socket at the balance point, and thus lifted with little exertion at will, and when in use was a powerful means to turn the boat in any direction wanted. At that time the capacity of this plant was ten barrels per day.

The canal, from this place down to the Allentown dam, was through a farming community, and the loam and clay on the banks of the canal were vulnerable places for the muskrats, which were plentiful. They seemed to be busy constantly, and would in a short time make a hole

in the embankment, which if not attended to, would empty the canal and stop transportation.

The method to remedy this was an alarm given by the bank watchman, the scow or cement boat sent for, which with the mules trotting, a man in front blowing a horn, giving them the right of way, the steersman on his platform at the rear, mean-while the workingmen were emptying the trays (which had been covered with a tarpaulin), on the bottom of the boat, mixing it with gravel and sand, dipping up water from the canal and making the concrete. As soon as the leak was reached a small coffer dam was built around it, water emptied and the concrete applied, stamped with wooden stampers in the break, the frame work removed as soon as grouting hardened. In those years Samuel Glace was supervisor of the canal from Slate Dam to Allentown Dam, in addition to the cement work at Siegfrieds until 1841.

He made daily double trips on horseback and in those primitive times attention was frequently called to him as the only man between those points who on work days wore a white shirt and stand-up collar, with a black stock.

In the fall of 1838, while passing along the line at the lock near Catasauqua, he noticed Frederick Biery, owner of the farm, Owen Rice, manager of Moravian Community affairs at Bethlehem, and several other gentlemen, standing on the east bank and looking in various directions, made inquiry of the lock-tender, Jonathan Snyder, what was the matter, and receiving no solution to his question, he passed over to see whether a leak had developed.

He was introduced to two gentlemen from Philadelphia, Directors of the Navigation Company, and informed they had purchased the farm, the title passing to Mr. Rice until the corporation was formed and would

erect a furnace, as this appeared to be the only level ground on the line within reasonable distance of the hematite ores. In a few days he received notice to sink shafts or holes at different points on the place to see if proper foundation could be obtained.

It will be remembered that the stockholders and subscribers to this enterprise, that is many of them, were the stockholders of the Navigation Company, and their object was to obtain a market for their coal, not then in general use, and also to secure transportation on their canal. If the Sherman trust law had been in force then it would not have been in violation thereof, but rather in complete accordance therewith under the Supreme Court decisions.

When David Thomas came here in 1839 the blast to run the furnace was made by the motive power of large water-wheels, and my father constructed the race or channel leading from the canal to the overshot wheels, then passing into the canal again below the lock, during which much cement was used. When it came to the erection of the furnace Mr. Thomas was much concerned to obtain the necessary hearth for the bottom of the furnace. Fire-bricks, manufactured at Perth Amboy, N. J., were only as large as the ordinary bricks of to-day, and no large fire-bricks made in the United States. To send to Wales would mean a question of three months, as it took him over six weeks to make the voyage from Europe.

My father suggested to him, he being a stranger in a strange land, to use the fire-stones above the Gap. He was soon ordered from the Mauch Chunk office to send men up, and selecting the stones, he had them cut, taken to the canal and brought down in boats. After they were placed in position he made a grouting of cement and spread it thick as a layer on top and sides, filling all the crevices.



FIRESTONES ABOVE LEHIGH GAP

This answered the purpose until about 1851-52, when large fire-bricks came into the market, and the old plan was no longer used, as it was a difficult job when a furnace was extinguished, needing a new lining, to blast out the foundation, which had become heavily encrusted with the debris mixed with iron.

The engraving shows these stones partially prepared, and for some reason abandoned, as it was left on the mountain 70 years ago, and photographed when I was there in 1906. During those first two years Mr. Thomas, recognizing his executive ability, made several efforts to induce my father to enter his employ, as his oldest son was then only 13 years of age, but he firmly declined. But there came a change in 1841; a freshet in that year destroyed a greater part of the canal. This made the Lehigh Coal and Navigation Company, for the time being, insolvent, owing to the scarcity of money. For some years Navigation scrip, certificates of indebtedness, had been given in payment of wages and materials, bearing interest, to creditors, which passed all along the line as cash, and now in 48 hours these proved worthless and could not be sold at ten cents on the dollar.

No person, unless they examine into the status of the money affairs of our nation at that period, can have any conception of conditions that then prevailed, and had prevailed following the veto of President Jackson of the rechartering of the United States bank at Philadelphia. Wealth consisted mainly in land and cattle. Only one bank, that at Easton, between there and Wilkes Barre. The little specie in circulation was mostly Spanish, levies, fips and quarters, Mexican dollars, and American cents, larger in size than our present twenty-five cent piece. These coins were much depreciated in value, owing to many years of wear, which coins only went out of circulation, and into the smelting pot, owing to the rise of silver during the civil war.

There were some American dollars in circulation, which were highly prized and looked to the holder almost as large as a cart wheel.

Then there was the prejudice against the banks and corporations generally, which had existed as a slogan of the political party then in power and were avoided as something that would destroy their liberties and would prevent them from enjoying the full blessings of the Declaration of Independence.

Naturally, my father felt depressed, as all his savings, some \$3,000, were in scrip, the savings of a lifetime, and being then 36 years of age. At this juncture Mr. Thomas renewed his offer, and further agreeing to take his scrip, which was also payable in lump coal at the mines, giving him a note of the Lehigh-Crane Iron Co., therefore, with interest.

Now, as he had no use for coal, nearly every person using wood for household purposes, and no stoves then manufactured to burn coal, he willingly accepted the offer.

He then moved to Catasauqua, and the freshet of 1841 was the inducing cause of the writer's childhood days and those of his succeeding manhood residence here.

From that time until 1873 he remained in the employ of the Lehigh Crane Iron Co. He had obtained a good English education, his father moving from Lancaster county in 1807, when he was two years of age, to become manager of the farms of the "Conyningham's," a family then, as now, prominent in the city of Lancaster. They had large landed interests in the southern section of Lancaster county, and founded the village of Conyningham on the turn-pike between Hazleton and Berwick; and whilst Pennsylvania German was the language of his father's family, the surroundings here were "English." The Conyninghams maintained a good English school in the settlement, advantage of which he enjoyed. In 1826 he occasionally traveled to Wilkes Barre to consult with



RUINS OF SECOND CEMENT MILL IN THE LEHIGH VALLEY

a lawyer in relation to the settlement of his father's estate, who was a son of the proprietor and afterward became President Judge of the Luzerne County Courts. Through his influence he became acquainted with Superintendent Abbott, of the canal company, then about assuming his duties, and the result was his going to Mauch Chunk as afore stated.

In addition to his correct English he was a fine penman, making his own pens from quills as was the custom, and his knowledge of Pennsylvania German, then indispensable. All these proved dominant factors in the position he was about to assume.

Shortly, two more furnaces were erected and subsequently, in 1850, two more, as the business had become financially a great success. The late Samuel A. Bridges informed me when a student at law that a decision had been handed down by the Supreme Court where, in the history of the case as published, it was shown in litigation between members of a family, the head of whom had been a large stockholder in the "Crane," that the dividends for quite a time had amounted to 40 per cent.

About this time, 1841, the charcoal furnaces were making some inroads on the deposits of hematite ore, one in the Aquashicola and one at Big Creek, both in Carbon county, and the Lehigh or Balliett's furnace above Slatington, and rumors that the Balliett's would erect furnaces at Allentown, which they afterward did. So no time was to be lost, and my father was appointed Mining Agent.

He explored the fields of the county, made a lease on the Troxell's farm, called Ritter's ore bed, North of Egypt, where a large deposit was discovered, which resulted afterward in litigation which found its way to the Supreme Court and resulted in a resumption of mining until the deposit was exhausted. Also in the vicinity of what is now Iron-ton, throughout East Texas, the White-

halls, Macungies and the Lehigh mountain, thence to Hanover township, in Northampton, and mines in Hanover township, Lehigh county. A large deposit above Siegersville, called Chamber's ore bed, reopened the mine near the cemetery at Catasauqua, which had been mined by the charcoal people, and at Mickleys, back in the woods near Seiple's station. The mines near the Lehigh were mostly wash ore. A washery, therefore, was erected where the L. V. depot here is erected, the tail race now being used by the C. & F. R. R. to supply with a turbine the locomotives with water. Another washery below the dam at Hokendauqua was also erected.

A difficulty soon arose here, as the riparian owners objected to the deposit of mine water into the river. Litigation ensued which ended in the Supreme Court. The opinion rendered implied, as Mr. Samuel Thomas informed me, that it would be unwise to throttle an infant industry, which would result in the development of the mineral wealth of the Commonwealth. It goes without saying that at this time no such opinion would be handed down. Of all these deposits none exceeded the Guth's mine, now known as the Koch and Balliett mine, near Guth's station. This mine had been opened by the charcoal people and ore smelted into charcoal iron at the Balliett furnaces, but no one ever expected that the mine would develop as it did. During the years up to 1854 my father mined tens of thousands of tons, the teams carting the ore to the furnaces in a line at times nearly a mile in length, this being prior to the construction of the Catasauqua and Fogelsville railroad.

He thus attracted the attention of Samuel Lewis, Sr., who offered increased salary, but he never wavered in his allegiance to the person through whom the savings of a lifetime had been retrieved. His attention was not wholly taken up with this work, for in 1846-7, when the Crane Iron Company installed their water plant for the houses

occupied by their employees he erected a reservoir. It was lined with bricks lined with cement, grouted in the bottom, on outer side banked up, covered with a tower, an opening near the top which when the cistern was full would automatically flow out into the company's field, where it percolated through the lime stone and found its way to the Catasauqua creek. This field became a famous swimming pool for the boys of that day and in the winter a splendid skating place.

In 1854, when the charter of the Catasauqua Gas Co. was obtained, he erected a large reservoir, to hold gas for storage, and to-day it is impregnable, the same methods with the cement being used.

The reservoir built in 1846-7 became too small for the Crane Co., having obtained a special act from the Legislature to furnish water to the inhabitants of Catasauqua and vicinity. About five years ago the old cistern foundation was demolished to furnish room for a tenant house for the gardener of the Williams' estate. Mr. Kern, the gardener, informed me that the walls were solid as granite, and it was only demolished by repeated explosions of dynamite. His last work was in 1872, when he erected a new reservoir at the northern end of the Borough, the same methods being used. The walls at this time are impregnable, and look as if they would last for centuries; but what no person could foresee, it rested on a limestone fissure or cavern, which, owing to natural causes, after 20 years, gave way, and the present stand-pipe was erected in its place.

In 1851 there was another large freshet in the Lehigh canal. The damage was not as great as 10 years prior, but after the canal was repaired there remained only a short time 'ere winter would close navigation. There were no railroads here then, and with but a small supply of coal, there appeared no remedy and the furnaces would be blown out until spring. In this dilemma my

father was called from his other work and sent to Mauch Chunk to obtain the boats to transport the coal.

Many of the boatmen owned their own boats at that time and he established his headquarters at the weighlock, one mile south of Mauch Chunk Church, and as the boats passed up through the lock made arrangements with the Captains, as they all knew him, and had confidence in him, and his offer of an increase of freight captured the bulk of the output and the situation was saved, the furnaces remaining in blast continuously during the winter.

In 1851-2 he constructed a new canal from the furnaces to the Hokendauqua dam, then known as Swartz's dam. There were two more furnaces erected in 1850, and as the power used to make blast was by overshot wheels, the old canal became dangerous, the water rushing rapidly, and boats loaded with coal would be caught in the torrent, would turn turtle, boatmen drown in the miniature Niagara.

Therefore a new canal was constructed, parallel to the old, which is now in use. In that day there were no dredges, and it was quite a sight to see three gangs of thirty or more men each wheeling the ground up an inclined plane, built on trestling, to make the high west embankment. There was also a large basin dug from the lock to the cinder bank on the river to act as a buffer and back water to remedy the rushing canal. Cement grouting was extensively used in this work, and for the small aqueducts to lead the water from the two springs, Peter's and Faust's, under the bed of the canal to the river. One of the small aqueducts is still in use, by the Bryden Horse Shoe Co., who thus have an outlet for their water to the river. It has never caused trouble and apparently is as perfect as it was when erected 60 years ago. In addition there was erected a tunnel to carry away the surplus water to the river, opposite the lock.

The first cement mill was completely destroyed by the 1841 freshet. The second plant, at Siegfrieds, is now in ruins. Subsequently, about 1860, it was leased by Messrs. Menninger, Kohl, Eickert and Ackerman. It was purchased from the Ackermans of New Jersey, operated for a time and sold to the Laurence Cement Co., who now have their extensive and prosperous plant adjoining and equipped with modern appliances and machinery.

In conclusion I would state, my father retired in 1872, having accumulated a reasonable competency, and lived thereafter 20 years. He was of correct habits, having as far as known no personal enemy, and by his Christian life his influence has been to me a constant benediction. He died January 3, 1892, aged 86 years, 2 months and 22 days.

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